PCI-to-IDE ATA-133 RAID Adapter AEC-6897/6897LP

User's Manual

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Chapter 1 Introduction

1.1 Overview

ACARD AEC-6897 and AEC-6897LP are 4-channel PCI-to-IDE RAID adapters, and are compatible with PCI-X interfaces on motherboards. They support RAID 0, 1, 0+1, 5 and JBOD. Among the two, AEC-6897LP is a low profile edition, that supports the standard 1U server. When used with ACARD ACS-4600 Tray, both AEC-6897 and AEC-6897LP can support hot swap, and become more convenient for system maintenance.

Suitable Applications

- DVR systems
- Workstations
- File servers
- Mail servers
- Mainframe backup systems
- Digital audio & video recording/editing systems

1.2 Features

- Supports PCI 64-bit/66Mhz
- PCI Bus bandwidth up to 533MB/s
- Supports up to 8 IDE hard drives
- Supports Hot Swap (with ACS-4600 tray, see Appendix D)
- Supports RAID 0, 1, 0+1, 5 and JBOD
- User-friendly Windows-based RAID Utility
- Notifies the abnormality of hard drive by email
- Supports ATA-133/100/66 hard drives
- Supports HDD spare function
- Supports Windows Storage Server 2003
- Expandable to more cards

1.3 Specifications

■	Power requirement ---	Voltage: 3.3V +/– 2%
		5V +/– 2%
		Current: 0.5A Max.
■	Environment ---	Operating temperature: 0°C to 70°C
		Storage temperature: –20°C to 85°C
■	Humidity ---	15% to 90%
■	Dimension ---	Width: 17.46cm
		Height: 8.26cm (for 6897)
		Width: 17.40cm
		Height: 6.44cm (for 6897LP)
■	IDE Connector ---	Four 40-pin IDE internal connectors

1.4 Package

The retail package of AEC-6897 or AEC-6897LP contains the following items.

- ■ AEC-6897 or AEC-6897LP × 1
- ■ Internal ATA 133 Cable × 4
- ■ Y-Splitter Power Cord × 2
- ■ User's Manual × 1
- ■ ACARD Support CD × 1

Chapter 2 Hardware Installation

2.1 Quick Installation

From this chapter on we simply take AEC-6897 as an example to explain.
(1). Be sure that the system power is off.
(2). Open the chassis of PC.
(3). Insert AEC-6897 into an available PCI slot firmly.
(4). Screw AEC-6897 onto the chassis.
(5). Connect AEC-6897 to the hard drives with an ATA 133 cable.
(6). Connect 4-pin power cords to the hard drives.
(7). Close the chassis, and power on the system.

2.2 The Adapter Layout

The layout of AEC-6897 board is shown as follows.

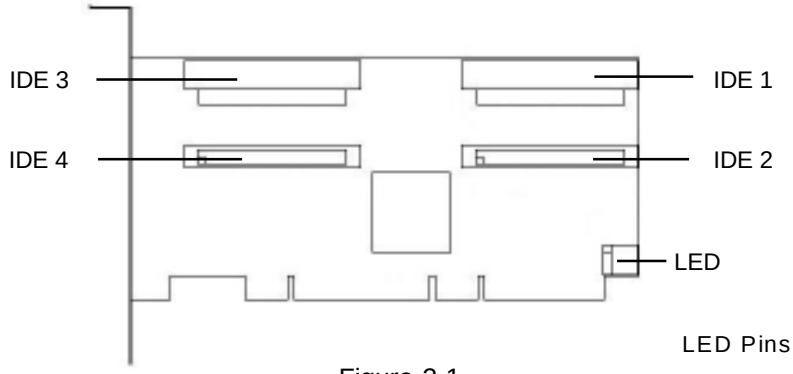
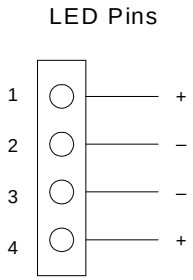


Figure 2-1



Pin 1 and pin 4 are +. Pin 2 and pin 3 are – .

2.3 Hard Drive Connection

(1). Find out a color line of the ATA 133 cable indicating pin 1 of the connector.
(2). Find out pin 1 of the IDE connector on the IDE hard drive(see HDD's manual).
(3). Connect the ATA 133 cable to the IDE hard drive by pin 1 to pin 1.
(4). Connect the 4-pin power cord to the IDE hard drive.

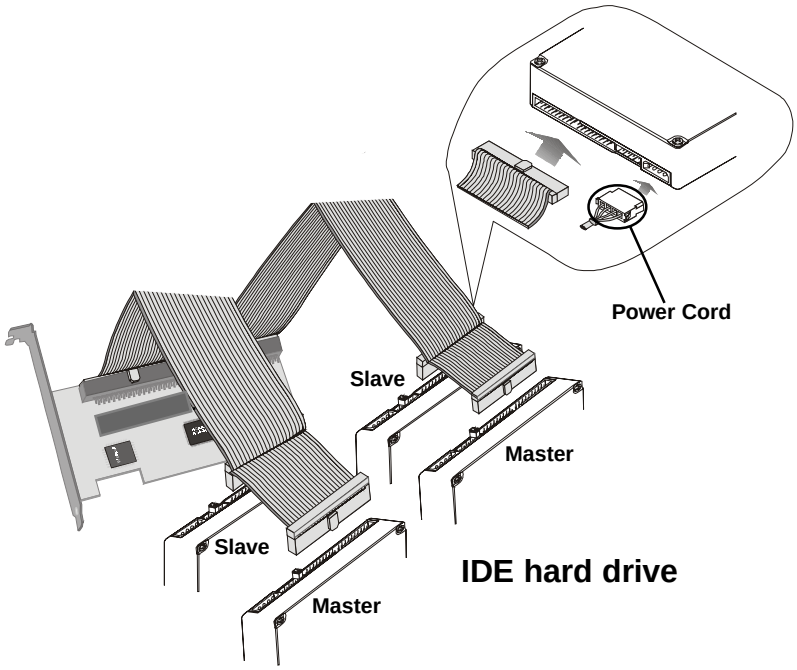


Figure 2-2

Please pay attention to the following important things:

1. If there are two hard drives on the same cable, set one hard drive's jumper as Master and the other's as Slave, or set both as Cable Select Mode.
2. Some hard drive has only Single Mode, but the Single Mode means Master Mode, so under this circumstance, set to Single Mode.

3. Refer to the following table for the number of hard drives and the Master/Slave setting according to figure 2-1.

	IDE 1	IDE 2	IDE 3	IDE 4
2 Hard Drives	Master	Master	X	X
4 Hard Drives	Master	Master	Master	Master
6 Hard Drives	Master & Slave	Master & Slave	Master	Master
8 Hard Drives	Master & Slave	Master & Slave	Master & Slave	Master & Slave

Table 2-1

2.4 Compatibility

AEC-6897 is particularly designed for IDE hard drive, and has been tested compatible with most main brands of hard drives as listed below.

- Quantum
- Seagate
- IBM
- Maxtor
- Fujitsu
- Hitachi
- Western Digital

For the newest compatibility, please visit http://www.acard.com.

NOTICE :

1. Hot swap is effective when AEC-6897 is used together with ACS-4600 (see Appendix D).
2. Hot swap is effective only when one hard drive is connected to one IDE channel.
3. Use the standard ATA 133 cable of 45 cm.

Chapter 3 BIOS Setup

After installing AEC-6897 and booting the system, once the detection of motherboard comes to an end, a screen as figure 3-1 will appear. The figure indicates your BIOS version, hard drive information, RAID status, etc.

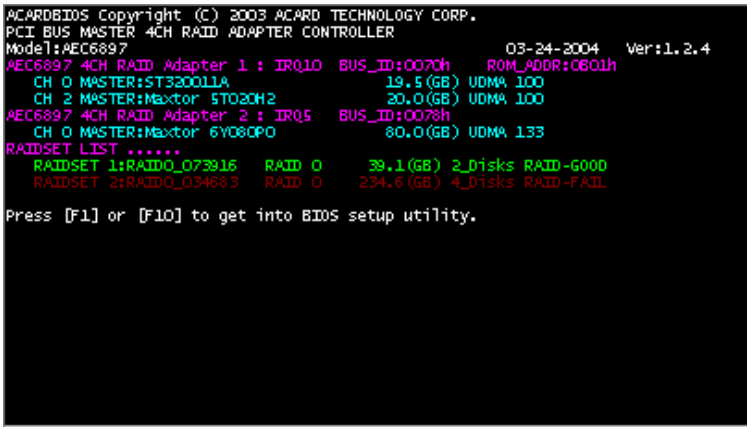

ACARDBIOS Copyright (C) 2003 ACARD TECHNOLOGY CORP.
PCI BUS MASTER 4CH RAID ADAPTER CONTROLLER
Model:AEC6897 03-24-2004 Ver:1.2.4
AEC6897 4CH RAID Adapter 1 : IRQ10 BUS_ID:0070h ROM_ADDR:C801h
CH 0 MASTER:ST320011A 19.5(GB) UDMA 100
CH 2 MASTER:Maxtor 5T020H2 20.0(GB) UDMA 100
AEC6897 4CH RAID Adapter 2 : IRQ5 BUS_ID:0078h
CH 0 MASTER:Maxtor 6Y080P0 80.0(GB) UDMA 133
RAIDSET LIST .....
RAIDSET 1:RAID0_073916 RAID 0 39.1(GB) 2_Disks RAID-GOOD
RAIDSET 2:RAID0_034683 RAID 0 234.6(GB) 4_Disks RAID-FAIL
Press [F1] or [F10] to get into BIOS setup utility.

Figure 3-1

Press <F1> or <F10> to enter BIOS Setup Utility. If there are more than one AEC-6897 adapters, choose one to configure by pressing <Enter>.

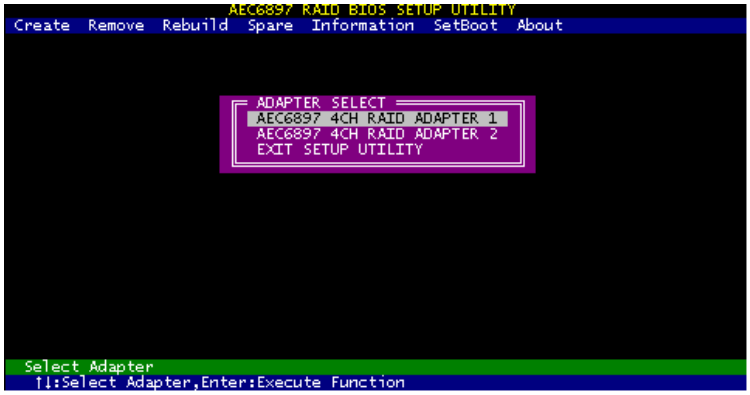

AEC6897 RAID BIOS SETUP UTILITY
Create Remove Rebuild Spare Information SetBoot About
ADAPTER SELECT
AEC6897 4CH RAID ADAPTER 1
AEC6897 4CH RAID ADAPTER 2
EXIT SETUP UTILITY
Select Adapter
↑↓:Select Adapter,Enter:Execute Function

Figure 3-2

3.1 Create Disk Array

3.1.1 RAID 0

RAID 0 is striping mode. It needs two hard drives at least, and accelerates the read/ write speed, but hasn't any fault tolerance. First, move the highlight bar to "Create", and choose RAID 0 from the pull-down menu by pressing <Enter> as figure 3-3 shows.

Figure 3-3

Second, determine the hard drives' block size. 128K is recommended to get optimum performance under most circumstances.

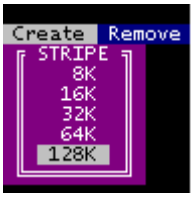


Figure 3-4

Third, choose the needed hard drives by moving the highlight bar and press the space bar to mark as figure 3-5 shows. An asterisk (*) will appear before the chosen hard drive.

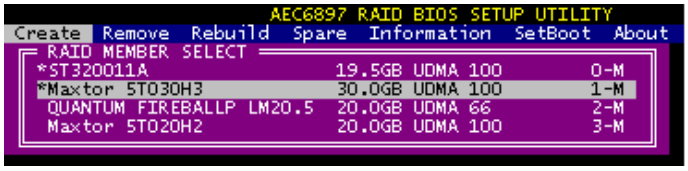


Figure 3-5

Then, the system will ask if the following information is correct. Please press <Y> to confirm as figure 3-6 shows.

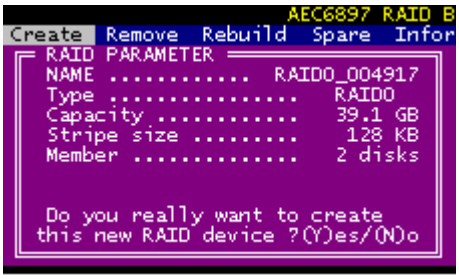

AEC6897 RAID B
Create Remove Rebuild Spare Infor
RAID PARAMETER
NAME ..... RAID0_004917
Type RAID0
Capacity ..... 39.1 GB
Stripe size ..... 128 KB
Member ..... 2 disks
Do you really want to create
this new RAID device ?(Y)es/(N)o

Figure 3-6

3.1.2 RAID 1

RAID 1 is mirroring mode with fault tolerance. Data are written into two hard drives at the same time, but one of the hard drives is used as backup, therefore the total capacity is only one hard drive's capacity. It is recommended to use two hard drives of the same size.

First, move the highlight bar to "Create", and choose RAID 1 from the pull-down menu by pressing <Enter> as figure 3-7 shows.

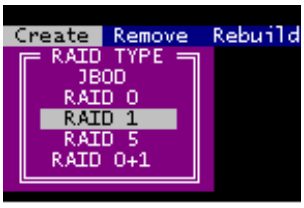


Figure 3-7

The system will ask if you want to create an all new RAID 1 or a mirror for the existing hard drive. Suppose to create an all new RAID 1 as figure 3-8 shows.

AEC6897 RAID BIOS SETUP UTILITY
Create Remove Rebuild Spare Information SetBoot
RAID1 CREATE TYPE
CREATE ALL NEW RAIDSET
CREATE MIRROR FOR EXIST HARD DISK

Figure 3-8

Create All New RAIDSET

This method lets you create an empty storage space. It means that the original data in the hard drives will be erased.

Choose two hard drives by moving the highlight bar and press the space bar to mark as figure 3-9 shows. An asterisk (*) will appear before the chosen hard drive.

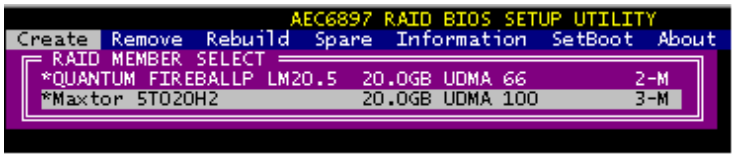

AEC6897 RAID BIOS SETUP UTILITY
Create Remove Rebuild Spare Information SetBoot About
RAID MEMBER SELECT
*QUANTUM FIREBALLP LM20.5 20.0GB UDMA 66 2-M
*Maxtor 5T020H2 20.0GB UDMA 100 3-M

Figure 3-9

The system will ask if the following information is correct. Please press <Y> to confirm as figure 3-10 shows.

Figure 3-10

Create Mirror for Exist Hard Disk

This method lets you take a hard drive as source drive. The data in the source drive will be completely copied to the other drive to create RAID 1.

AEC6897 RAID BIOS
Create Remove Rebuild Spare Informat
RAID1 CREATE TYPE
CREATE ALL NEW RAIDSET
CREATE MIRROR FOR EXIST HARD DISK

Figure 3-11

Choose the source drive.

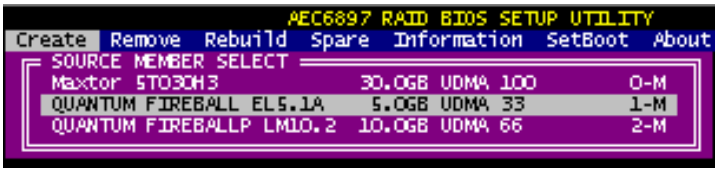

AEC6897 RAID BIOS SETUP UTILITY
Create Remove Rebuild Spare Information SetBoot About
SOURCE MEMBER SELECT
Maxtor 5TO3OH3 30.OGB UDMA 1OO O-M
QUANTUM FIREBALL EL5.1A 5.OGB UDMA 33 1-M
QUANTUM FIREBALLP LM1O.2 1O.OGB UDMA 66 2-M

Figure 3-12

Choose the hard drive to which you intend to copy the data of the source drive.

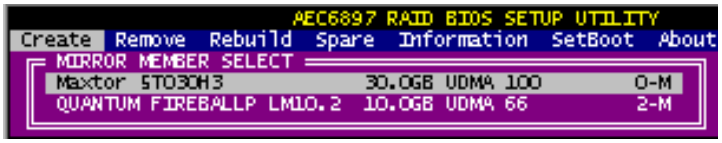

AEC6897 RAID BIOS SETUP UTILITY
Create Remove Rebuild Spare Information SetBoot About
MIRROR MEMBER SELECT
Maxtor 5TO3OH3 30.OGB UDMA 1OO O-M
QUANTUM FIREBALLP LM1O.2 1O.OGB UDMA 66 2-M

Figure 3-13

The system will ask again if the information below is correct. Press <Y> to confirm.

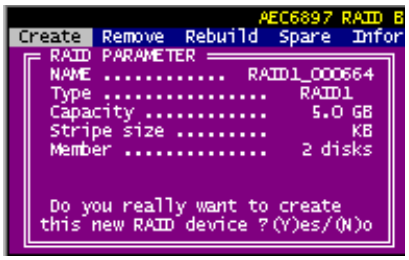


Figure 3-14

3.1.3 RAID 5

RAID 5 is striping with rotating parity mode. It requires three hard drives at least. RAID 5 uses one hard drive to store parity data as fault tolerance. First, move the hgihlight bar to “Create”, and choose RAID 5 from the pull-down menu by pressing <Enter> as figure 3-15 shows.

Figure 3-15

Second, choose three hard drives at least by moving the highlight bar, and press the space bar to mark as figure 3-16 shows. An asterisk (*) will appear before the chosen hard drive.

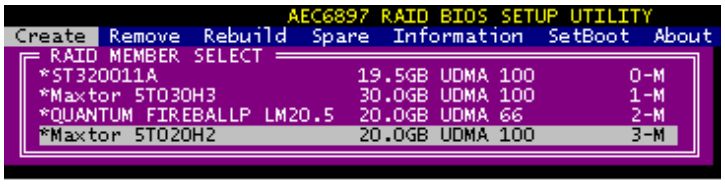

AEC6897 RAID BIOS SETUP UTILITY
Create Remove Rebuild Spare Information SetBoot About
RAID MEMBER SELECT
*ST320011A 19.5GB UDMA 100 0-M
*Maxtor 5T030H3 30.0GB UDMA 100 1-M
*QUANTUM FIREBALLP LM20.5 20.0GB UDMA 66 2-M
*Maxtor 5T020H2 20.0GB UDMA 100 3-M

Figure 3-16

Third, the system will ask if the following information is correct. Please press <Y> to confirm as figure 3-17 shows.

AEC6897 RAID BI
Create Remove Rebuild Spare Inform
RAID PARAMETER
NAME ..... RAID5_007691
Type RAID5
Capacity ..... 58.6 GB
Stripe size ..... 8 KB
Member ..... 4 disks
Do you really want to create
this new RAID device ?(Y)es/(N)o

Figure 3-17

3.1.4 RAID 0+1

RAID 0+1 is striping+mirroring mode. It needs at least four hard dirves, and has the advantages of quick read/write and fault tolerance.

First, move the highlight bar to “Create”, and choose RAID 0+1 from the pull-down menu by pressing <Enter> as figure 3-18 shows.

Figure 3-18

Now determine the hard drives' block size. 128K is recommended to get optimum performance under most circumstances.

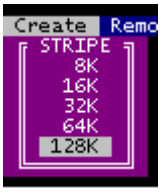


Figure 3-19

Choose four hard drives, and press the space bar to mark as figure 3-20 shows. An asterisk (*) will appear before the chosen hard drive.

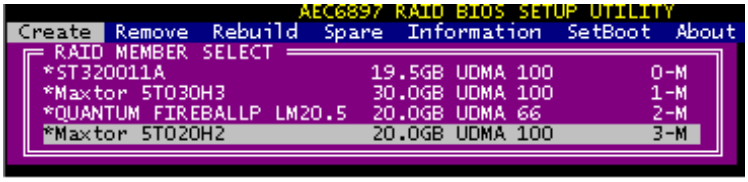


Figure 3-20

The system will ask if the following information is correct. Please press <Y> to confirm as figure 3-21 shows.

Figure 3-21

3.1.5 JBOD

JBOD (Just a Bunch of Disks) is not a RAID mode. Its capacity is the total of all hard drives' capacities.

First, move the hgihlight bar to “Create”, and choose JBOD from the pull-down menu by pressing <Enter> as figure 3-22 shows.

Figure 3-22

Choose the needed hard drives, and press the space bar to mark as figure 3-23 shows. An asterisk (*) will appear before the chosen hard drive.

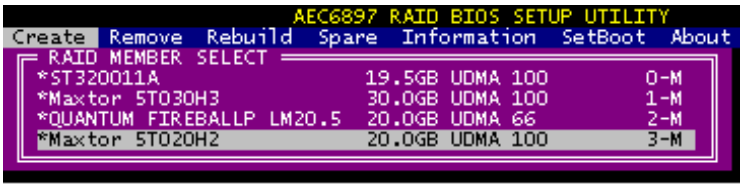


Figure 3-23

The system will ask if the following information is correct. Please press <Y> to confirm as figure 3-24 shows.

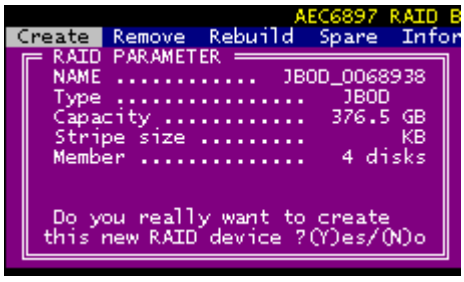


Figure 3-24

	Disk 1	Disk 2	Disk 3	Disk 4	Total Capacity
RAID 0	10G	20G	*	*	20G
RAID 1	10G	20G	*	*	10G
RAID 5	10G	20G	30G	*	20G
RAID 0+1	10G	20G	30G	40G	20G
JBOD	10G	20G	30G	40G	100G

Table 3-1 The total capacity of different disk array

3.2 Verify RAID Configuration

Move the highlight bar to “Information”, and choose RAID Device from the pull-down menu by pressing <Enter>. Verify the RAID configuration as figure 3-25 shows.

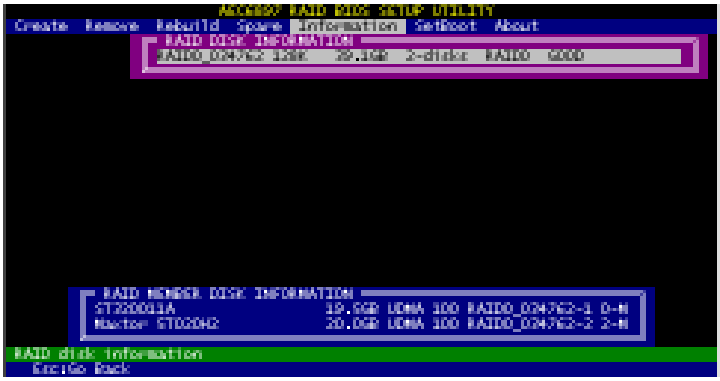


Figure 3-25

3.3 Rebuild Disk Array

In Windows the AEC-6897 Utility can detect and rebuild Disk Array automatically after replacing a failed hard drive with a new one. In BIOS you need to use “Rebuild” to restore Disk Array manually. Here “Rebuild” is an alternative of data rebuilding when you cannot start Windows.

Upon booting, the BIOS of AEC-6897 will inspect the related information of hard drives. If there is an array error, the screen will display the following two modes for choice: (1) Take it into degrade mode; (2) Stopping it.

(1) Take it into degrade mode means that you can set spare to rebuild the array. (2) Stopping it means that you cannot rebuild the array. If you are not sure whether the newly replaced hard drive contains the data you need or not, please shoose (2) to enter OS, and then decide if to rebuild or not.

ACARDBIOS Copyright (C) 2003 ACARD TECHNOLOGY CORP.
PCI BUS MASTER 4CH RAID ADAPTER CONTROLLER
Model:AEC6897 03-24-2004 Ver:1.2.4
AEC6897 4CH RAID Adapter 1 : IRQ10 BUS_ID:0070h ROM_ADDR:0C01h
CH 0 MASTER:Maxtor 5T030H3 30.0(GB) UDMA 100
CH 1 MASTER:QUANTUM FIREBALL EL5.1A 5.0(GB) UDMA 33
RAIDSET LIST .....
Warnning!! Broken RAID Found
NAME ..... RAID1_002341
Type RAID1
Capacity ..... 10.0 GB
Stripe size ..... KB
Member ..... 2 disks
This RAID disk was broken,
What do you want to do ?
1.Take it into degrade mode.
2.Stopping it.
your choice?(2)

Figure 3-26

If you choose (1) Take it into degrade mode, the array status will be in yellow as figure 3-27 shows.

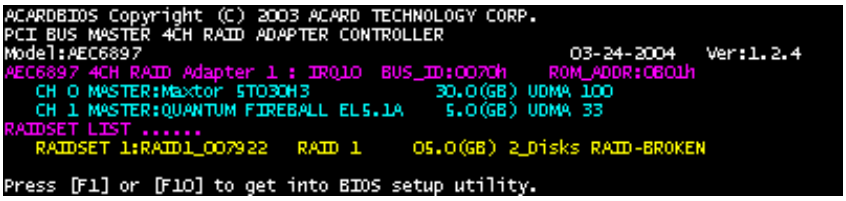

ACARDBIOS Copyright (C) 2003 ACARD TECHNOLOGY CORP.
PCI BUS MASTER 4CH RAID ADAPTER CONTROLLER
Model:AEC6897 03-24-2004 Ver:1.2.4
AEC6897 4CH RAID Adapter 1 : IRQ10 BUS_ID:0070h ROM_ADDR:0B01h
CH 0 MASTER:Maxtor 5T030H3 30.0(GB) UDMA 100
CH 1 MASTER:QUANTUM FIREBALL EL5.1A 5.0(GB) UDMA 33
RAIDSET LIST .....
RAIDSET 1:RAID1_007922 RAID 1 05.0(GB) 2_Disks RAID-BROKEN
Press [F1] or [F10] to get into BIOS setup utility.

Figure 3-27

When you want to set a spare hard drive to rebuild the array, you can choose it by moving the highlihgt bar and press the space bar to mark as figure 3-28 shows. An asterisk (*) will appear before the chosen hard drive. Press <Enter> to save your setting, or press <Esc> to cancel.

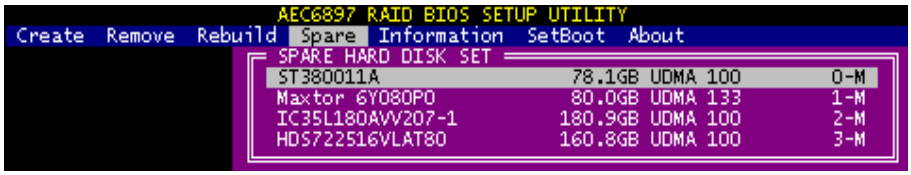

AEC6897 RAID BIOS SETUP UTILITY
Create Remove Rebuild Spare Information SetBoot About
SPARE HARD DISK SET
ST380011A 78.1GB UDMA 100 0-M
Maxtor 6Y080P0 80.0GB UDMA 133 1-M
IC35L180AVV207-1 180.9GB UDMA 100 2-M
HDS722516VLAT80 160.8GB UDMA 100 3-M

Figure 3-28

Choose the array you want to rebuild.

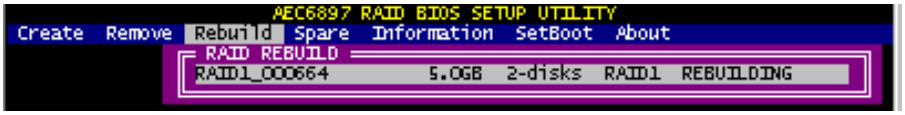

AEC6897 RAID BIOS SETUP UTILITY
Create Remove Rebuild Spare Information SetBoot About
RAID REBUILD
RAID1_000664 5.0GB 2-disks RAID1 REBUILDING

Figure 3-29

Start the rebuilding.

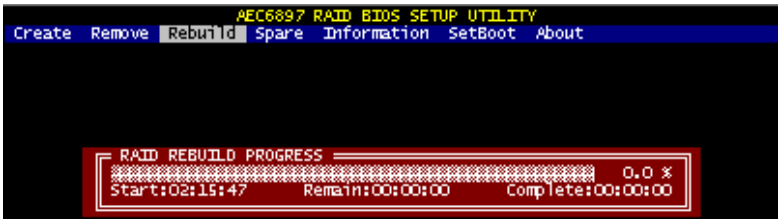

AEC6897 RAID BIOS SETUP UTILITY
Create Remove Rebuild Spare Information SetBoot About
RAID REBUILD PROGRESS
0.0 %
Start:02:15:47 Remain:00:00:00 Complete:00:00:00

Figure 3-30

If you choose (2) Stopping it, the array status will be in red as figure 3-31 shows. Please enter OS directly.

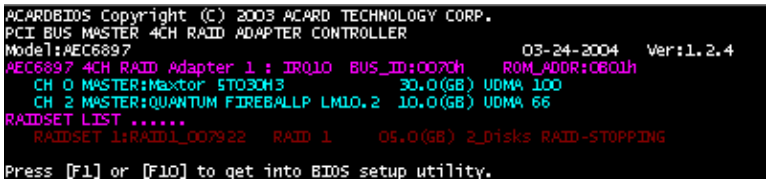

ACARDBIOS Copyright (C) 2003 ACARD TECHNOLOGY CORP.
PCI BUS MASTER 4CH RAID ADAPTER CONTROLLER
Model:AEC6897 03-24-2004 Ver:1.2.4
AEC6897 4CH RAID Adapter 1 : IRQ10 BUS_ID:0070h ROM_ADDR:C801h
CH 0 MASTER:Maxtor 5T030H3 30.0(GB) UDMA 100
CH 2 MASTER:QUANTUM FIREBALLP LM10.2 10.0(GB) UDMA 66
RAIDSET LIST .....
RAIDSET 1:RAID1_007922 RAID 1 05.0(GB) 2_Disks RAID-STOPPING
Press [F1] or [F10] to get into BIOS setup utility.

Figure 3-31

3.4 Remove

If you want to remove a Disk Array, move the highlight bar to “Remove”, and choose an array to delete as figure 3-32 shows. The data of the hard drives will be totally deleted.

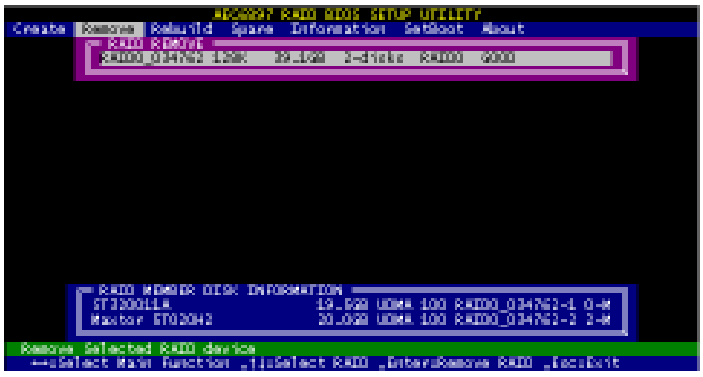


Figure 3-32

WARNING !
Do not remove a Disk Array unless you are 100% sure that the data in that array has been successfully backed up or the data is no longer needed.

3.5 SetBoot

If you have set more than one disk arrays, SetBoot lets you choose from which one to boot. Suppose you want to boot from AEC-6897 on which you have installed OS, you can move the highlight bar to “SetBoot”, press <Enter> and set as figure 3-33 shows. If there are two AEC-6897s, the final setting is the effective one.

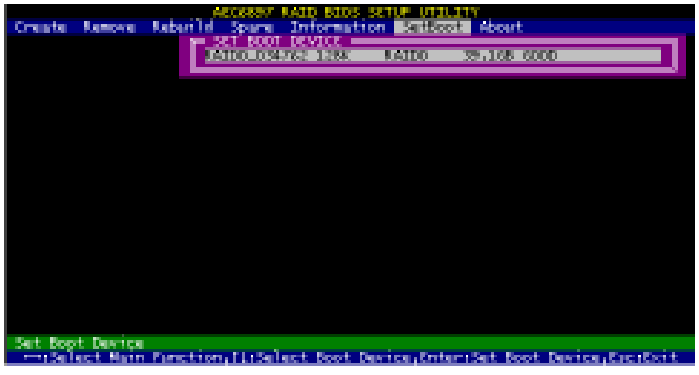


Figure 3-33

Chapter 4 System & Driver Installation

Driver installation varies in different operating systems. You can install the driver of AEC-6897 in existing OS, or install OS to the hard drives connected to AEC-6897, and boot from the adapter.

The driver is on the support CD. Its path is \Drivers\IDE\AEC6897. It only supports Windows 2000/XP/Server 2003. Here we merely demonstrate in Windows XP.

4.1 Install the Driver

Please follow the steps below to install the driver of AEC-6897.

(1). After installing AEC-6897, boot the computer and enter Windows XP.

(2). The system will detect a new device and require a directory to access. Select "Install from a list or specific location (Advanced)". Then click "Next".

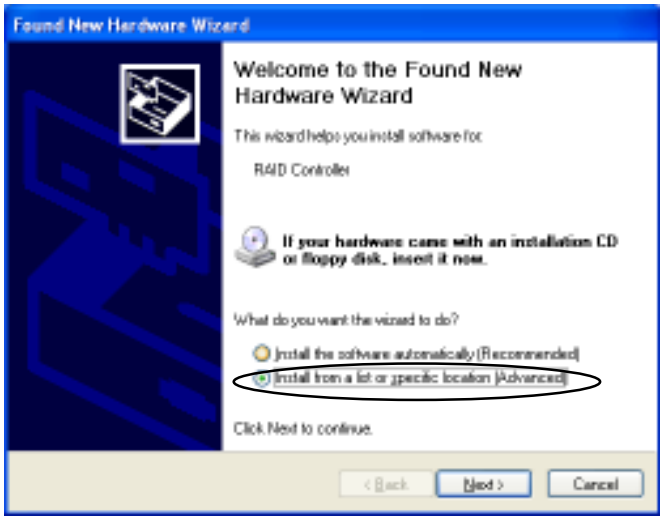

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install software for:
RAID Controller
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

Figure 4-1

(3). Follow the wizard. Windows XP will require the driver's location. Select "Include this location in the search".

(4). Select “Browse” to find the driver’s directory such as E:\Documents...
(5). After the wizard finds the driver, click “Next” to install it.

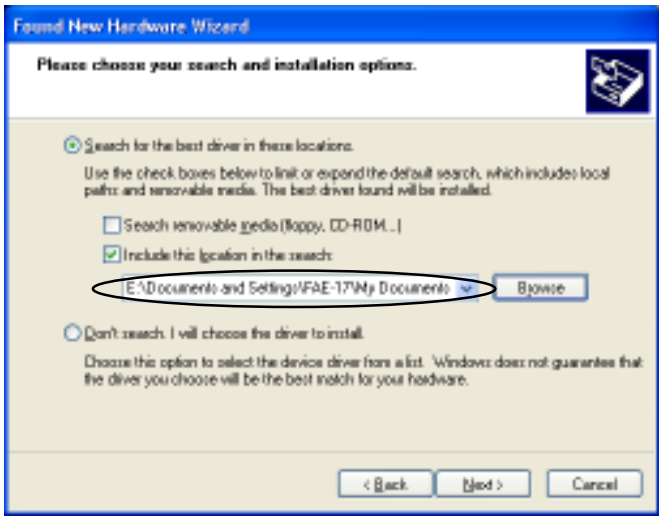

Found New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM...)
Include this location in the search:
E:\Documents and Settings\FAE-17\My Documents
Browse
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back
Next >
Cancel

Figure 4-2

(6). Click “Continue Anyway” to continue the installation.
(7). Follow the directions. The system will complete the setup automatically.

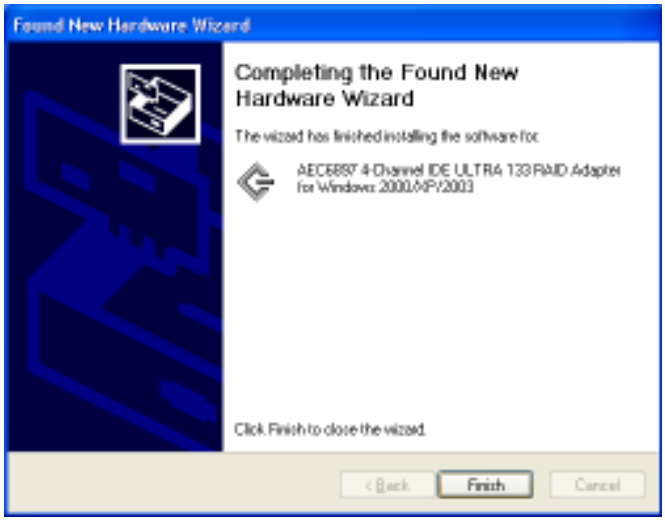

Found New Hardware Wizard
Completing the Found New Hardware Wizard
The wizard has finished installing the software for:
AEC6897 4-Channel IDE ULTRA 133 RAID Adapter for Windows 2000/XP/2003
Click Finish to close the wizard.
< Back
Finish
Cancel

Figure 4-3

Repeat the above 7 steps to complete the installation.

4.2 Verify the Driver Installation

After installing the driver, please follow the steps below to verify.
(1). Boot the system again, and click “My Computer”.

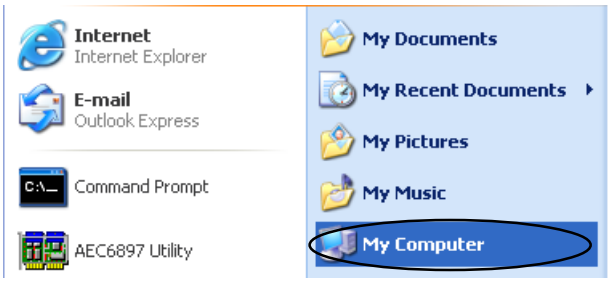


Figure 4-4

(2). Find “View system information”, and click it.

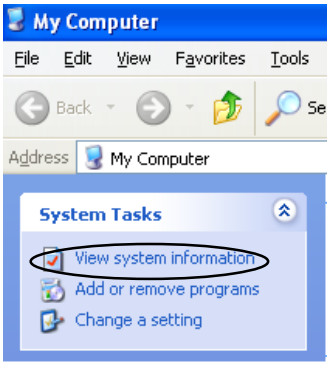


Figure 4-5

(3). In “System Properties” click “Hardware”.

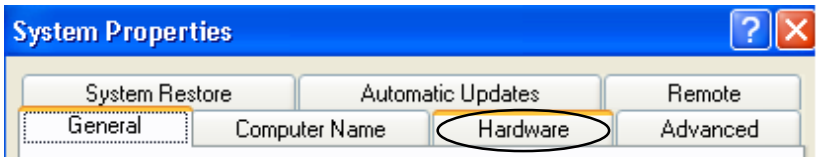


Figure 4-6

(4). Then click “Device Manager”.

Add Hardware Wizard
The Add Hardware Wizard helps you install hardware.
Add Hardware Wizard
Device Manager
The Device Manager lists all the hardware devices installed on your computer. Use the Device Manager to change the properties of any device.
Driver Signing
Device Manager

Figure 4-7

(5). Double click “SCSI and RAID Controllers” to see if the card was installed successfully.

Figure 4-8

4.3 Install OS to Disk Array

Please follow the steps below to install OS to the hard drives connected to AEC-6897. Thus you can boot the system from AEC-6897.

(1). Find the support CD containing the driver of AEC-6897 from the package. Copy the driver into a formatted floppy disk, and label it. Refer to Appendix B.

(2). Enter the BIOS to create an Array and set boot in order to boot from the Array. Refer to 3.1 and 3.5.

(3). Place the original CD of Win 2000, XP or Server 2003 into CD-ROM, and boot the computer.

(4). On seeing the first blue screen, press <F6>. Then press <S> and put the driver disk into floppy drive. The installation program will load the driver of AEC-6897.

(5). Choose the hard drives or array into which you prepare to install the OS. Then follow the wizard to complete.

(6). During installation, if you encounter the problem of Windows logo, click “Continue Anyway”.

Chapter 5 The RAID Utility

The ACARD RAID Utility provides a user-friendly GUI for you to manage efficiently. The settings you do here will affect those in BIOS immediately. In other words, the settings in the utility and BIOS are synchronized.

5.1 Install the Utility

Please follow the steps below to install the utility.
(1). Place the support CD into CD-ROM.
(2). Double click “setup” under E:\Utility\AEC-6897.
(3). Follow the wizard to complete.

Welcome
Welcome to the AEC-6897 RAID Utility Setup program. This program will install AEC-6897 RAID Utility on your computer.
It is strongly recommended that you exit all Windows programs before running the Setup program.
Click Cancel to quit Setup and then close any programs you have running. Click Next to continue with the Setup program.
WARNING: This program is protected by copyright law and international treaties.
Unauthorized reproduction or distribution of this program, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under law.
< Back
Next >
Cancel

Figure 5-1

5.2 Operate the Utility

Click “Start”, “Programs”, “AEC-6897 RAID Utility” to use the following functions.

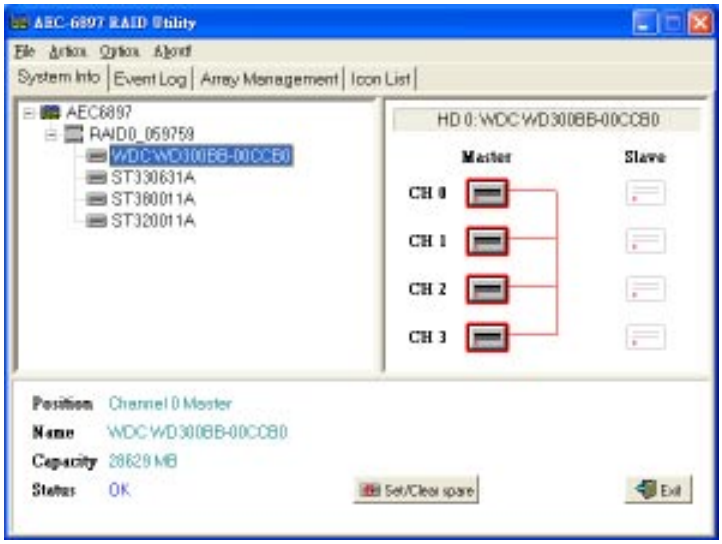


Figure 5-2

5.2.1 Create Disk Array

The RAID Utility helps you create RAID 0, RAID 1, RAID 5, RAID 0+1 and JBOD. You need to click “Create Array” under “Array Management” first.

RAID 0

Please follow the steps below to create RAID 0.

(1). Under “Array Management” choose RAID 0 from RAID Mode.

(2). Choose the block size from Stripe Size. 128K is recommended.

(3). Double click HD to choose needed hard drives.

(4). Click “Confirm Create”.

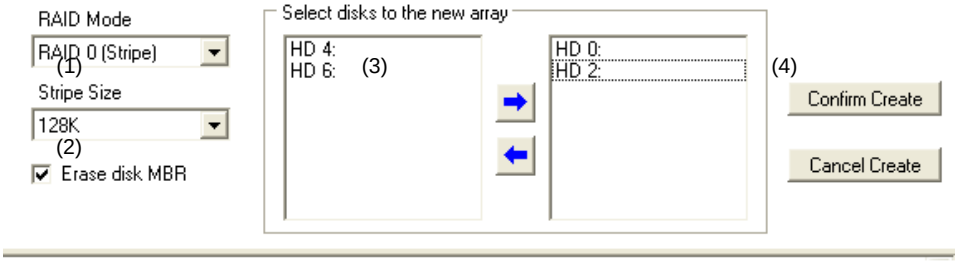


Figure 5-3

(5). Click “Save Changes”.

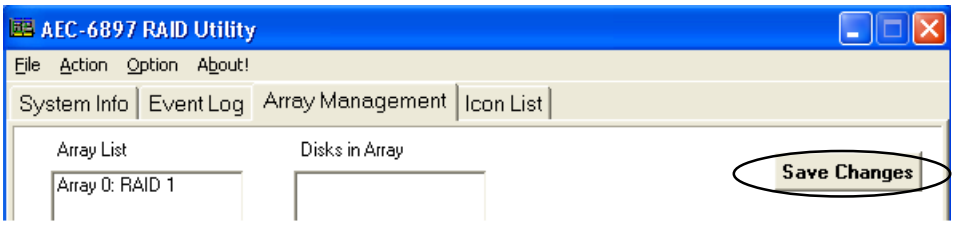


Figure 5-4

The completion of RAID 0 is as the following figure shows.

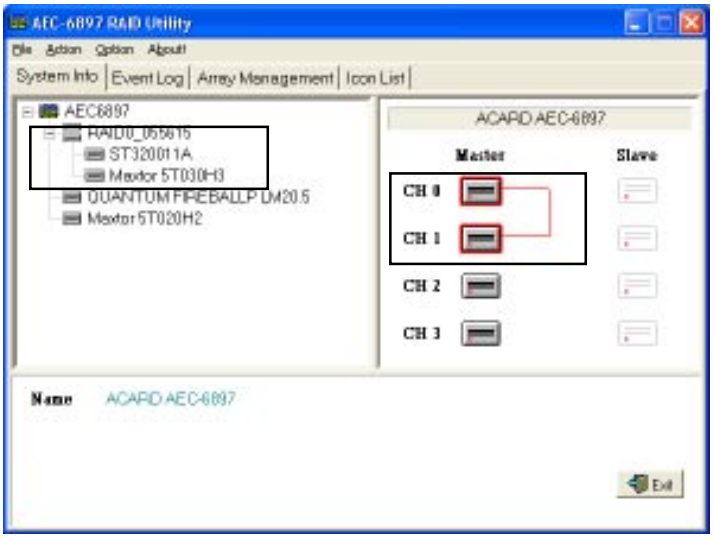


Figure 5-5

Figure 5-6 on the next page shows the completion of two sets of RAID 0. The creation methods are the same.

Figure 5-6

RAID 1

A. Create All New RAIDSET

This method lets you create an empty storage space. It means that the original data in the hard drives will be erased.

Please follow the steps below to create RAID 1.

(1). Under “Array Management” choose RAID 1 from RAID Mode.

(2). Click “Erase Disk MBR” to update the existing master boot record.

(3). Double click HD to choose two hard drives.

(4). Click “Confirm Create”.

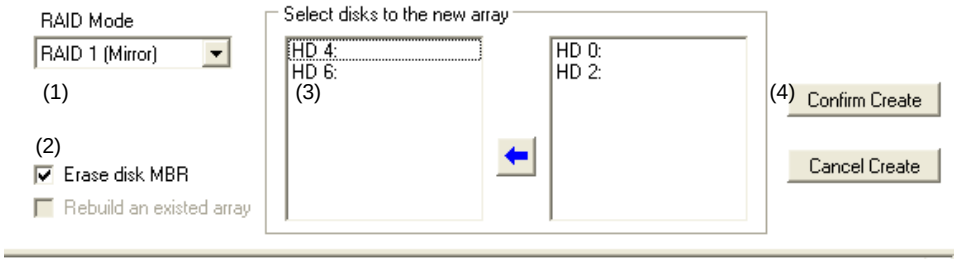


Figure 5-7

(5). Click “Save Changes”. See figure 5-4.

The completion of RAID 1 is as the following figure shows.

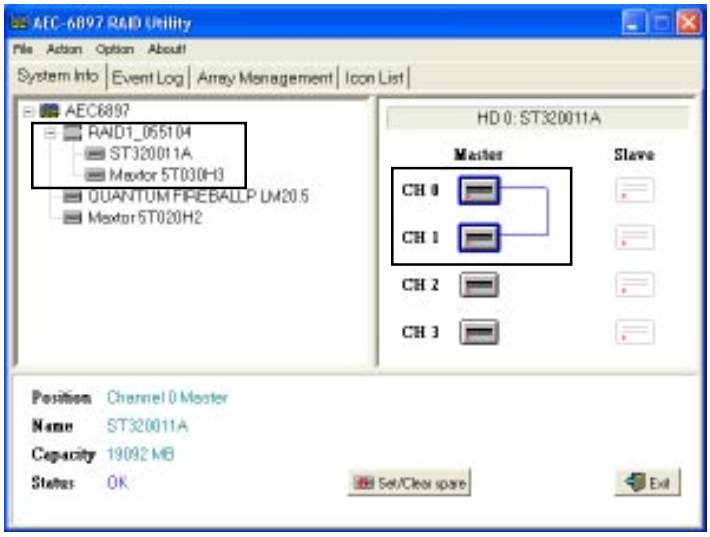


Figure 5-8

B. Create Mirror for Exist Hard Disk

This method lets you take a hard drive as source drive. The data in the source drive will be completely copied to the other drive to create RAID 1.

Please follow the steps below to create RAID 1.

(1). Under “Array Management” choose RAID 1 from RAID Mode.

(2). Click “Rebuild an existed array”.

(3). Double click HD to choose two hard drives (the first chosen one is source).

(4). Click “Confirm Create”. See figure 5-9.

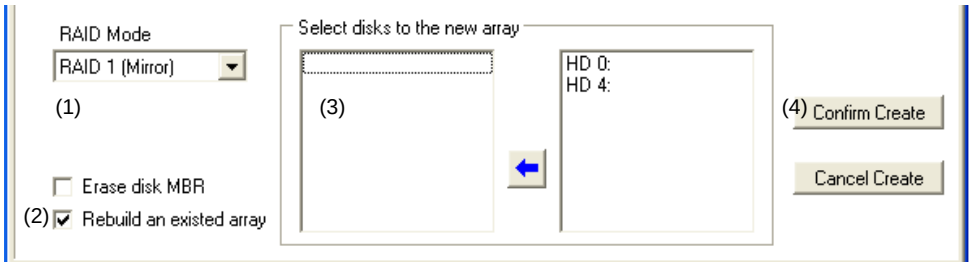


Figure 5-9

(5). Click “Save Changes”. See figure 5-4.

(6). A new RAID set will appear. The status of target disk will show Bad. Boot again, and the system will rebuild the disk automatically.

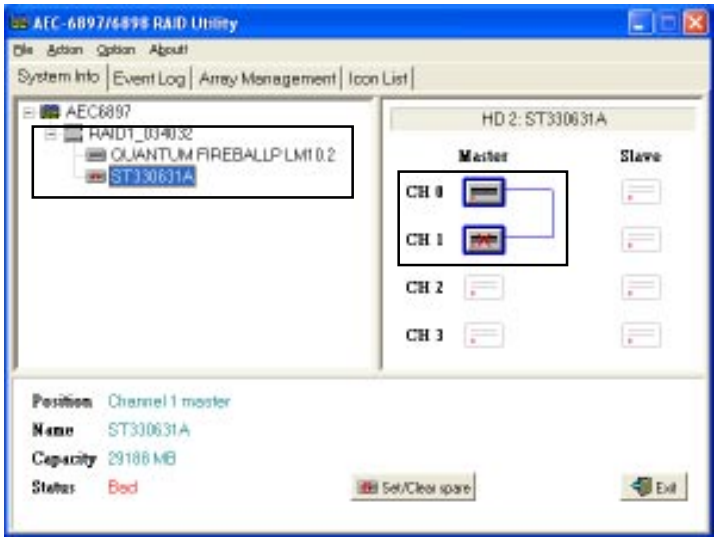


Figure 5-10

You can create antother set of RAID 1, too. Figure 5-11 shows the completion of two sets of RAID 1. The creation methods are the same.

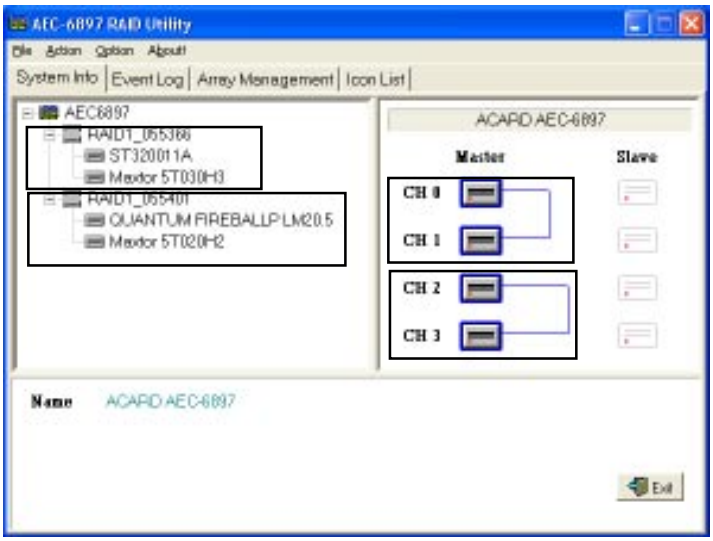


Figure 5-11

RAID 5

Please follow the steps below to create RAID 5.

(1). Under “Array Management” choose RAID 5 from RAID Mode.

(2). Double click HD to choose at least three hard drives.

(3). Click “Confirm Create”.

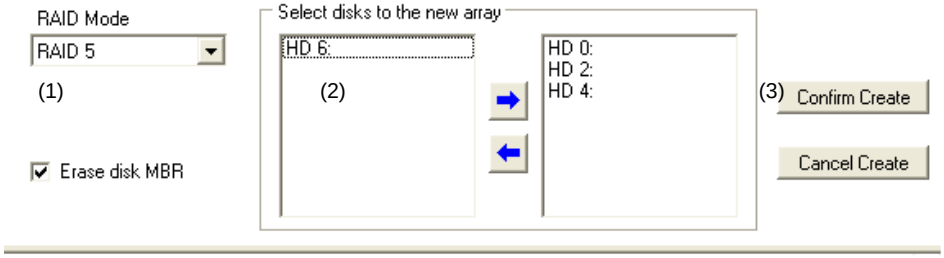


Figure 5-12

(4). Click “Save Changes”. Please see Figure 5-4.

The completion of RAID 5 is as figure 5-13 shows.

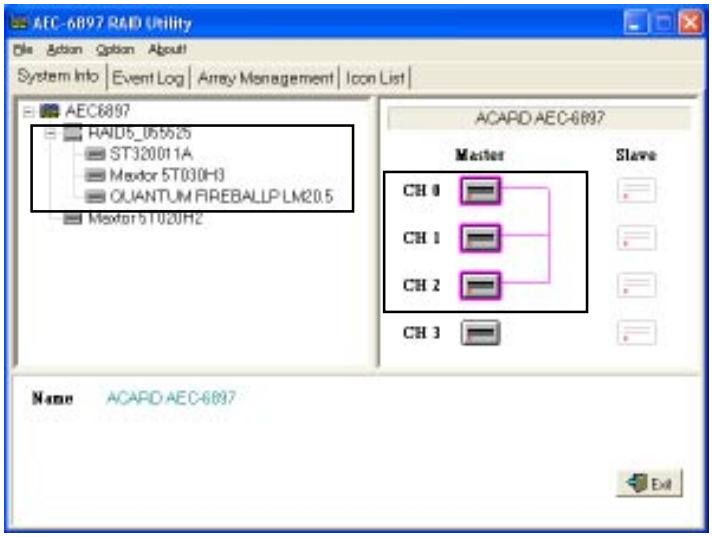


Figure 5-13

RAID 0+1

Please follow the steps below to create RAID 0+1.

(1). Under “Array Management” choose RAID 0+1 from RAID Mode.

(2). Choose the block size from Stripe Size. 128K is recommended.

(3). Double click HD to choose at least 4 hard drives.

(4). Click “Confirm Create”.

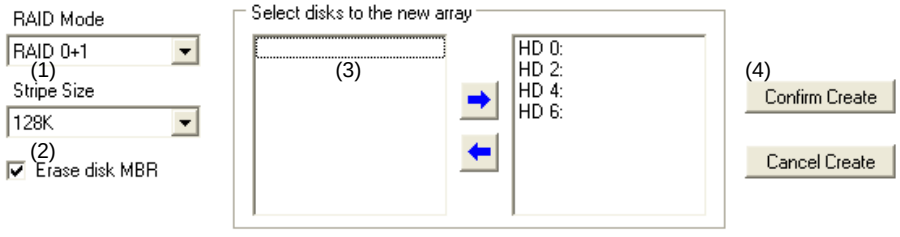


Figure 5-14

(5). Click “Save Changes”. Please see Figure 5-4.

The completion of RAID 0+1 is as figure 5-15 shows.

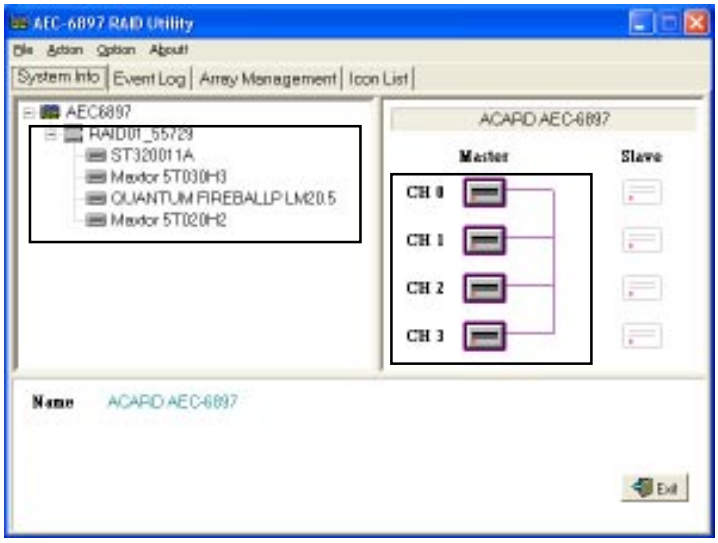


Figure 5-15

JBOD

Please follow the steps below to create JBOD.

(1). Under “Array Management” choose JBOD from RAID Mode.

(2). Double click HD to choose needed hard drives.

(3). Click “Confirm Create”.

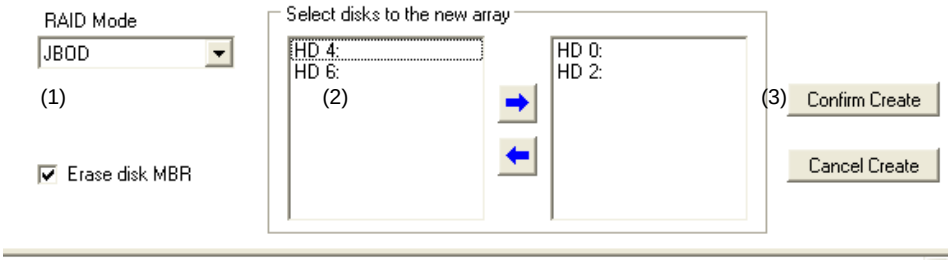


Figure 5-16

(4). Click “Save Changes”. Please see Figure 5-4.

The completion of JBOD is as figure 5-17 shows.

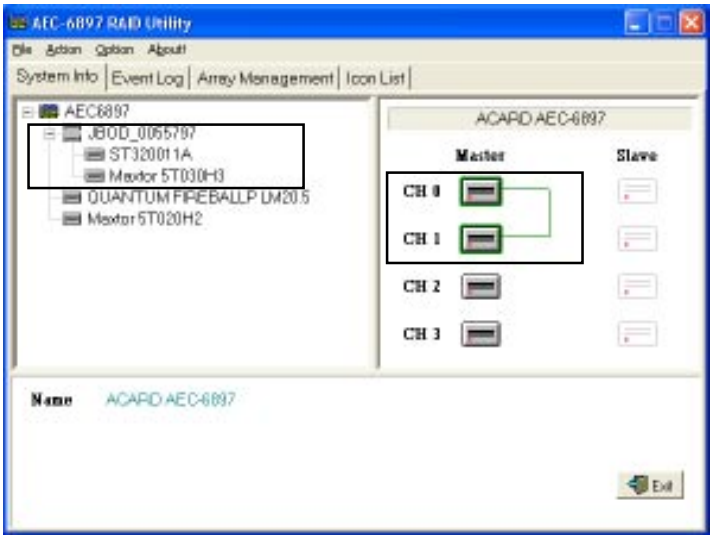


Figure 5-17

5.2.2 Delete Disk Array

If you don’t need a set of Array, you can follow the steps below to delete it.
(1). Under “Array Management” choose the RAID you want to delete.
(2). Click “Delete Array” under “Array Management”.

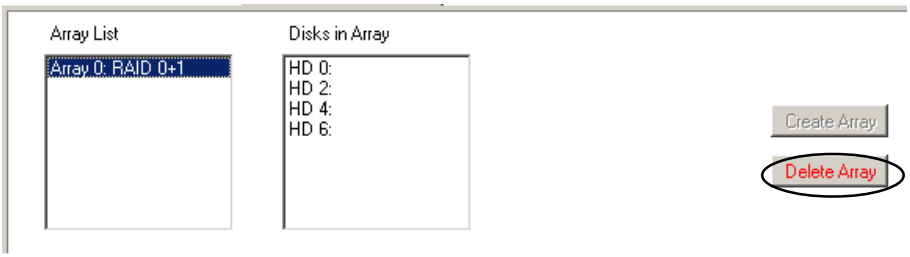


Figure 5-18

(3). The system will ask again if you want to delete. Confrim yes.
(4). Click “Save Changes”. The RAID and the hard drives’ data will be deleted.

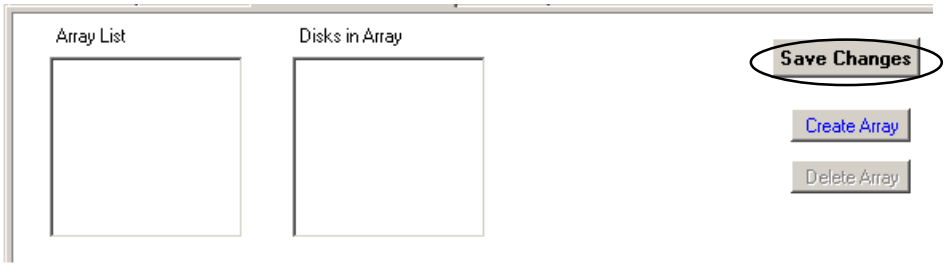


Figure 5-19

WARNING !
Make sure that you have made a valid backup of your existing data before deleting any set of Array. ACARD is not responsible for any data loss caused by the deletion.

5.2.3 Set Spare

In order to protect your data further, it is recommended to set a spare disk. When Disk Array is damaged, if you have set a spare disk, the system will rebuild the Disk Array automatically.

Under “System Info” click hard drives and “Set/Clear spare” at the bottom as figure 5-20 shows.

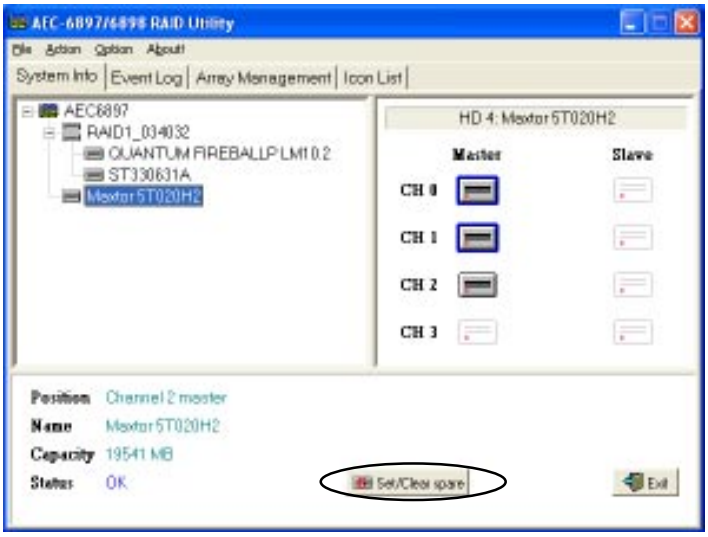


Figure 5-20

The completion of setting a spare disk is as figure 5-21 shows.

Figure 5-21

5.3 Two AEC-6897s

If you have two or more AEC-6897 adapters, and want to create a Disk Array on one of them, you can achieve by the utility, too. First, you need to click “System Info” in the utility, and then choose the desired adapter as figure 5-22 shows.

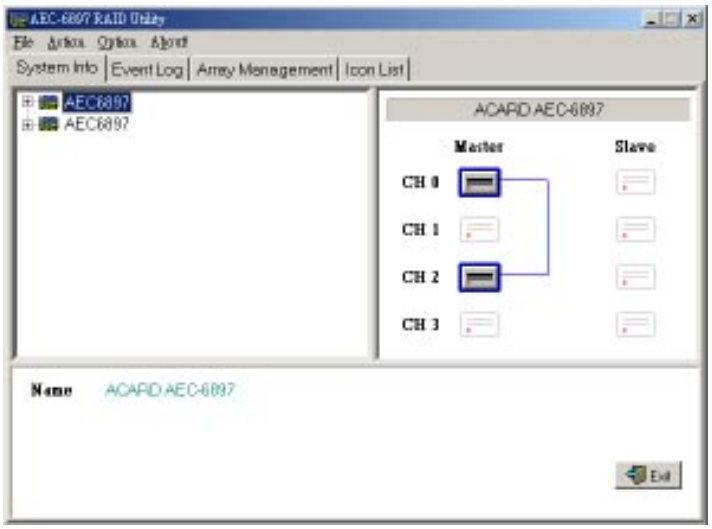


Figure 5-22

The creation methods are the same as those described in 5.2.1.

5.4 Mail Notification

In the RAID Utility click “Option” to find “Mail Notification Setup”. It can send you a warning mail when one of the RAID settings goes wrong, and tell you to maintain. It includes two main parts: Mail Setup and Supervisor as figure 5-23 and figure 5-24 show.

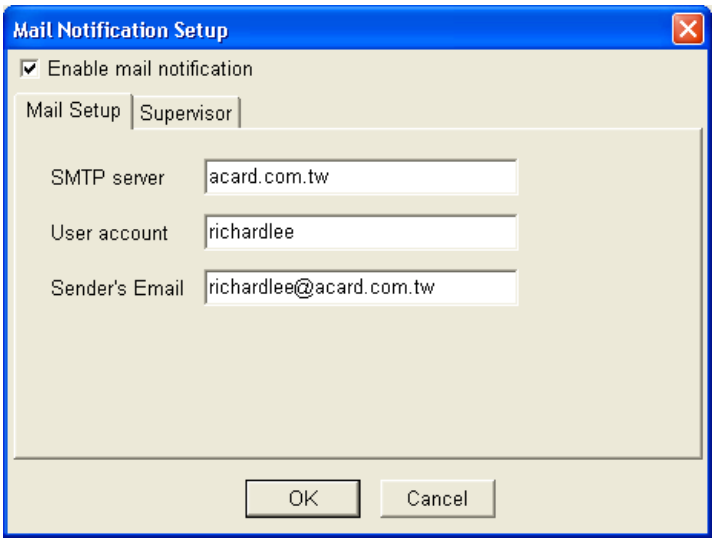


Figure 5-23

On figure 5-23 be sure that “Enable mail notification” is selected, and input the sender’s data in “SMTP server” and “User account”.

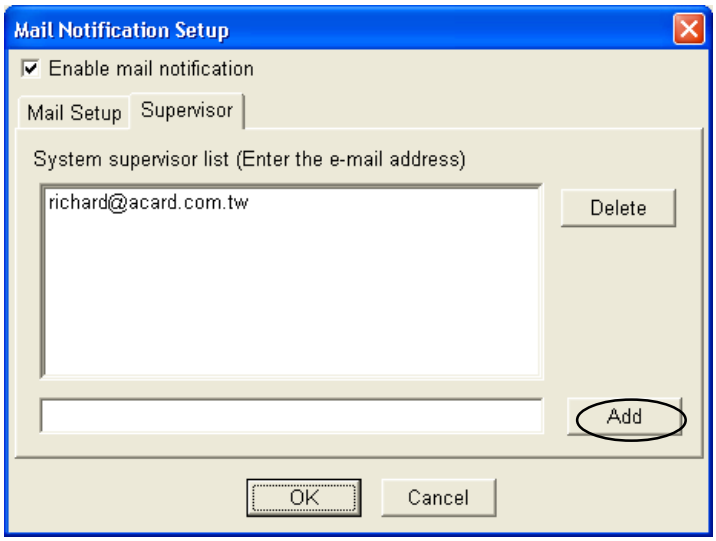


Figure 5-24

On figure 5-24 input the recipient’s e-mail address, and click “Add”.

NOTICE : Mail Notification and Event Log take effective only when the RAID Utility is running. You may minimize the utility into taskbar.

5.5 Event Log

Click “Event Log” to find all important things about RAID such as the change of RAID mode, the damage, removal, adding and rebuilding of hard drive, etc.

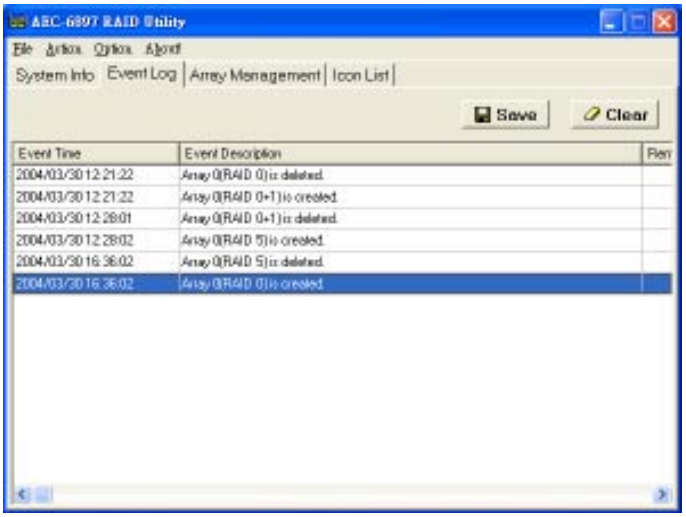


Figure 5-25

5.6 Icon List

Click “Icon List” to see icons of RAID modes, Spare, Rebuilding, etc. You can check this list to understand the status of Array. See figure 5-26.

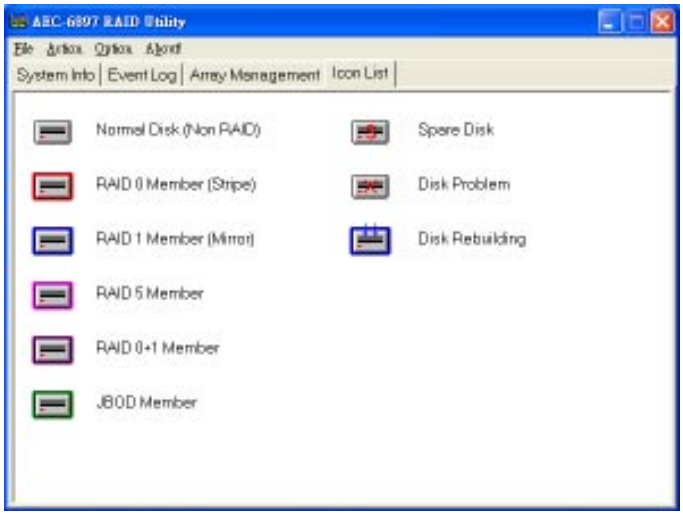

AEC-6897 RAID Utility
File Action Option Alert
System Info
Event Log
Array Management
Icon List
Normal Disk (Non RAID)
Spare Disk
RAID 0 Member (Stripe)
Disk Problem
RAID 1 Member (Mirror)
Disk Rebuilding
RAID 5 Member
RAID 0+1 Member
JBOD Member

Figure 5-26

Chapter 6 Troubleshooting

After installing AEC-6897, if it cannot work normally, follow the checklist below for problem solving.

(1). Inspect if the power cord's connectors are loose, or if the wattage of power supply is sufficient.

(2). Inspect if the jumper settings on the hard drives are set as table 2-1.

(3). Inspect if AEC-6897 is firmly inserted into the PCI slot.

(4). Inspect if the connectors of ATA 133 cable are loose or damaged.

(5). Inspect if the cable length is the standard ATA 133 of 45 cm.

Appendix A About RAID

RAID (Redundant Array of Independent Disks) is a system composed of many hard drives; that is, multiple physical drives form a single virtual drive to be recognized by the system. The advantages of RAID technology are increasing the read/write speed of a hard drive, achieving better data protection, and enlarging the capacity of a single drive like Drive C, Drive D, etc. Different classes of RAID have different composition modes and different functions.

A-1 RAID 0 (Striping)

RAID 0 must be composed of a pair of hard drives at least. When data are written into the whole hard drive, they will be equally striped and written into each hard drive of the array. Thus the access speed becomes quicker. The effect of RAID 0 is proportioned to the number of hard drives. More hard drives mean more read/write heads, and therefore the speed is quicker. Though RAID 0 is quick in read/write speed, it has no data redundancy, and accordingly has no fault tolerance.

It is suggested to compose RAID 0 with hard drives of the same capacity. Because the capacity of striped disk array is the multiplication of the smallest hard drive capacity with the number of hard drives. For example, a 100GB hard drive and two 120GB hard drives unite into RAID 0. The total capacity is 300GB (100GB×3).

A-2 RAID 1 (Mirroring)

RAID 1 must be composed of hard drives in even number. The RAID controller will divide the hard drives into a pair, and write data simultaneously into the two hard drives. The two hard drives contain the same data. When one hard drive's data are damaged, you can replace the failed hard drive, and the RAID controller will restore the data by the backup on the other hard drive. For a single hard drive RAID 1 is the best in fault tolerance.

It is suggested to compose RAID 1 with hard drives of the same capacity. Because the capacity of mirrored disk array is that of the smallest hard drive. For example, a 100GB hard drive and a 120GB one unite into RAID 1. The total capacity is 100GB.

A-3 RAID 5 (Striping with Rotating Parity)

RAID 5 must be composed of three hard drives at least. The parity data of RAID 5 are not fixed in the same hard drive, but stored in every hard drive in turn. Accordingly, it is called rotating parity. After the RAID controller calculates the parity checking data by XOR, the parity checking data will be written into each hard drive along with data, so the overall performance is slower than RAID 0. RAID 5 can provide higher fault tolerance.

It is suggested to compose RAID 5 with hard drives of the same capacity. The capacity of striped disk array with rotating parity is the multiplication of the smallest hard drive capacity with the number of hard drives minus one. For example, a 100GB hard drive and two 120GB hard drives unite into RAID 5. The total capacity is 200GB (100GB$\times$2).

A-4 RAID 0+1 (Striping/Mirroring)

RAID 0+1 is the combination of striping and mirroring. It has the advantages of two RAID classes. The RAID controller allocates the writing of data equally among some hard drives, and in the meantime backs up the data onto other hard drives. Accordingly, it has the advantages of fault tolerance and quick read/write speed. RAID 0+1 needs at least 4 hard drives in even number. Its calculation of capacity is the same as RAID 1. A half of the capacity is used for backup. It takes the smallest hard drive capacity as the calculation basis. For example, four 100GB hard drives unite into RAID 0+1. The total capacity is 200GB.

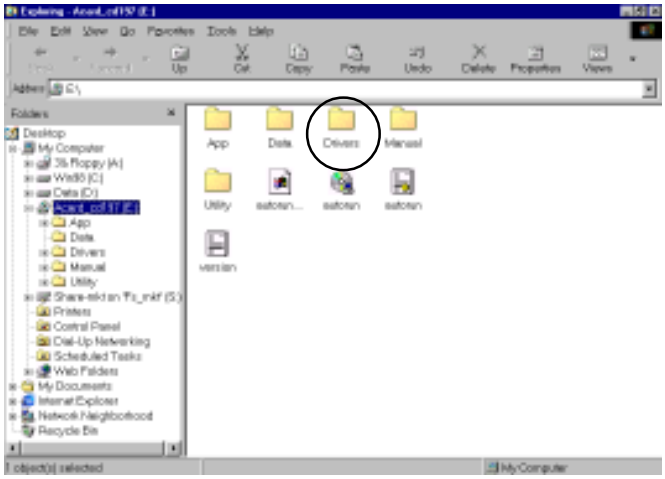
A-5 JBOD (Just a Bunch of Disks)

JBOD, formal word spanning, is not a real RAID setting. It simply links a bunch of disks into a big hard drive. It doesn't have the functions of quick read/write speed and error tolerance. However, compared with RAID 0, JBOD doesn't waste the hard drive capacity. Its capacity is the total of all hard drive capacities. For example, set a 100GB hard drive and a 120GB one as JBOD. The total capacity is 220GB.

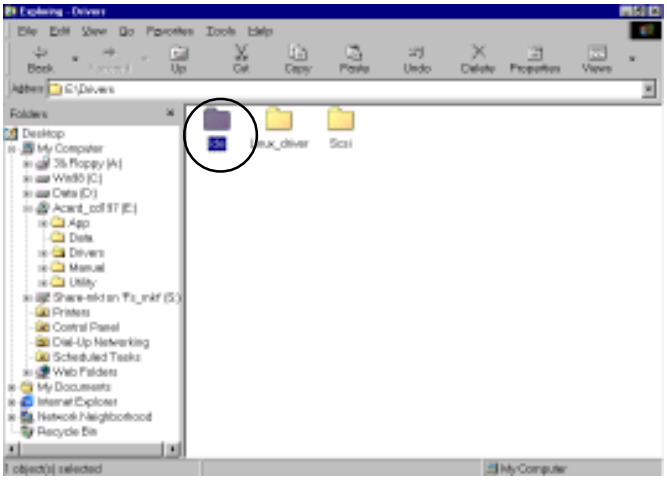
Appendix B Make A Driver Disk

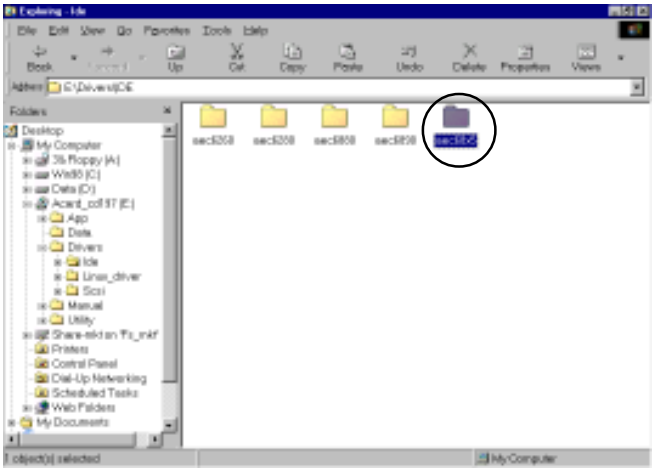
For installing an OS like Windows XP into a hard drive with ACARD adapter, you need a floppy disk containing the adapter's driver to boot the hard drive. Please follow the steps below to make an ACARD adapter's driver disk.

1. Insert ACARD Support CD into CD-ROM.
2. Click "Explore This CD" and then get the CD file window.

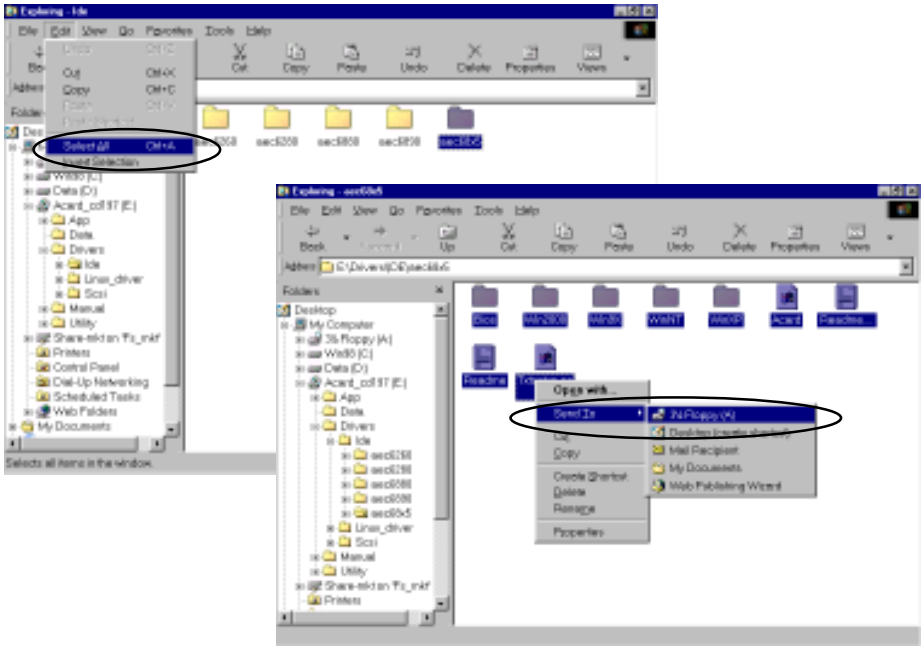


3. Under the “Driver” folder find your adapter’s model number. For example, AEC-68x5’s driver is Driver>IDE>AEC68x5.

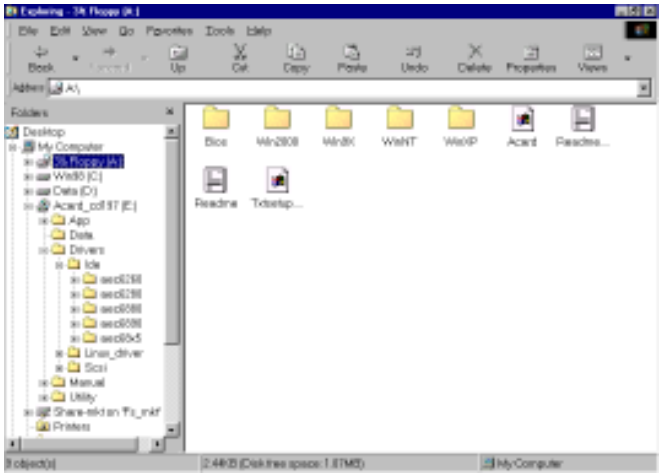




4. Choose the driver folder, and right-click “Send to 3.5” floppy”. Meanwhile insert an empty disk into floppy drive.



5. Now use the driver disk to boot the hard drive and install the OS.



Appendix C ASPITool32 Manager

The ASPITool32 Manager program has many functions aimed at making the hard drives work properly under the Windows OS while they are connected with the ACARD SCSI or IDE adapter. The ASPITool32 Manager program is proudly developed by ACARD. You may get the setup program from the ACARD Driver CD.

ASPITool32 Manager Functions

1.**FDsik**: Create a partition on the hard drive.
2.**Disk QErase**: Quickly erase the contents of the hard drive. Please beware that the data on the partition will be completely erased.
3.**Disk Format**: Format the partition.
4.**Disk Diagnose**: Detect the hard drive and check whether it works properly.
5.**Disk information**: Provide the information of BPB and the partition.
6.**Disk Verify**: Verify the hard drive and check if there is any bad sector.
7.**On Now**: Scan the SCSI bus again and check if there is any new device added.
8.**About**: Provide information of ASPITool32.
9.**Hide**: Hide the tool bar.
10.**Disk Express Setup**: Instruct how to create and format the partition.

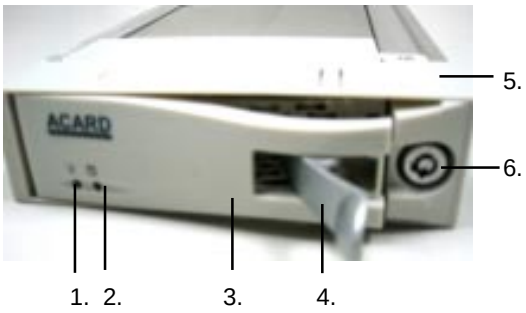
Appendix D About ACS-4600

The ACS-4600 tray contains a front panel, a rear panel and a key lock.

The Front Panel

The front panel of ACS-4600 contains six parts.

1. Power & active LED
2. Rebuilding & error LED
3. Handle
4. Active handle
5. Hot Swap housing
6. Key lock



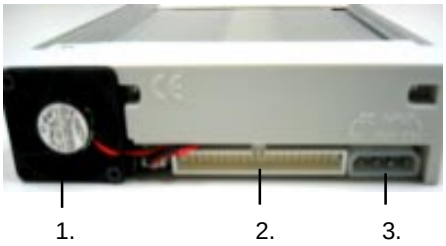
On the front panel of ACS-4600 there are two bicolor LEDs. Their meanings are as the following table shows.

Item	Meaning
LED 1 -- Forever Green	Normal power status
LED 1 -- Blinking Orange	Data transfer
LED 2 -- Blinking Green	HDD is under rebuilding
LED 2 -- Blinking Red	HDD is failed or abnormal

The Rear Panel

On the rear panel ACS-4600 contains three parts.

1. Fan 2. 40-pin IDE connector 3. 4-pin power cord connector



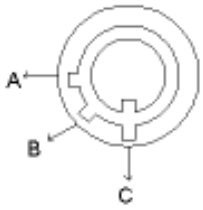
The Key Lock

The key lock of ACS-4600 is divided into three positions.

A: lock for normal use

B: power off HDD

C: Unlock to separate the internal and external cases



The Troubleshooting

Symptom	Solutions
2 LEDs don't light	1. Inspect if the key lock has been turned to Position A. 2. Inspect if the power cord behind the tray is loose.
No HDD detected	Inspect if the cable connected to the hard drive and tray is firmly connected or damaged. *
LED 2 blinking in red	Send the hard drive for repair (during warranty) or purchase a new hard drive to replace the damaged one.*

* Be careful when connecting or disconnecting the HDD cable otherwise the damaged cable will cause data transfer to be unstable or even make the drive inaccessible.

* Please back up your data at once if there is a big noise producing in access.

Technical Support Form

Email: **support@acard.com**

http://www.acard.com

Model	AEC-6897/6897LP	**F/W Version**	
System Configuration			
Motherboard			
BIOS version			
SCSI adapter			
Chipset			
Memory			
Display card			
Other I/O card			
OS version			
Hard Disk Configuration			
Hard Disk Model/type			
Capacity			
Firmware version			
Others			
Problem Description			